IN THE CLAIMS:

Claims 1, 12, 14, 16, 17, 30, 40, 42, and 44 have been amended, and claims 2 and 18 have been cancelled as follows:

1. (Currently Amended) A method for determining segment bandwidth capacity of a test segment in a network, the method comprising:

identifying a plurality of links that commonly share the test segment to be tested, the test segment being directly connected to a first ~~network device~~ router and a second ~~network device~~ router;

sending a plurality of packet profiles from a plurality of source nodes to a plurality of destination nodes via the plurality of links, each link of the plurality of links connecting a source node with a destination node, each link including the test segment, and each of the plurality of source nodes being under the centralized control of a central server remote to each of the plurality of source nodes;

manipulating start times for sending the plurality of packet profiles~~, or a portion thereof,~~ from the plurality of source nodes~~, or a portion thereof,~~ so that the plurality of packet profiles flow through the test segment ~~essentially~~ simultaneously, wherein the central server is utilized to command the plurality of source nodes to send the plurality of packet profiles at specific start times; and

receiving the plurality of packet profiles at the plurality of destination nodes, wherein each of the packet profiles comprises a plurality of packets, and byte count measurements and time stamps are made at the plurality of destination nodes.

2. (Cancelled)

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3. (Original) The method of claim 1, wherein the network is a time synchronized network and each of the plurality of packet profiles is a packet burst.

4. (Previously Presented) The method of claim 3, wherein the length L of each of the packet bursts is related to a Degree of Desynchronization (DoD) by an expression, $L = \frac{DoD}{ErrLim}$, where ErrLim represents a maximum desired error in the segment bandwidth capacity determination.

5. (Original) The method of claim 4, wherein the time stamps made at each of the plurality of destination nodes are a first time stamp TS_{first} of the first packet of the packet burst received from each corresponding source node and a last time stamp TS_{last} of the last packet of the packet burst received from each corresponding source node, and the byte count measurements measure the bytes $Bytes_{total}$ in each of the packet bursts received at each corresponding destination node.

6. (Original) The method of claim 5, wherein an individual flow rate in bit per second due to each packet burst is calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{TS_{last} - TS_{first}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

7. (Original) The method of claim 1, wherein the network is a non-time synchronized network and each of the plurality of packet profiles is a packet stream, and a plurality of byte count measurements are made over a time measurement period T at each of the plurality of destination nodes.

8. (Previously Presented) The method of claim 7, wherein the length $L_{multiple}$ of the packet stream is related to a Degree of Desynchronization (DoD) by an

expression, $L_{multiple} = (4 * T) + 2\varepsilon$, where the time measurement period T is one half of DoD and epsilon ε is used to compensate for small timing errors.

9. (Original) The method of claim 8, wherein the time stamps made at each of the plurality of destination nodes are a plurality of time measurements MT_n, where n is an integer, each time measurements MT_n being separated by the time measurement period T and each measuring byte count over the period T since last time measurement MT_{n-1} in each of the packet streams received at each corresponding destination node.

10. (Original) The method of claim 9, wherein an individual flow rate in bit per second due to each packet stream at the test segment is related to the smallest byte count measurement $Bytes_{total}$ of all byte count measurements taken for the packet stream, the individual flow rate being calculated using an expression,

$Rate(bps) = \frac{Bytes_{total} * 8}{MT_n - MT_{n-1}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

11. (Original) The method of claim 1, wherein a link bandwidth capacity of a link is determined by measuring the bandwidth capacity of each of the segments that make up the link, the link having a maximum throughput of the slowest segment in the link.

12. (Currently Amended) A method for determining bandwidth capacity of a test segment in a time synchronized network, the method comprising:

identifying a plurality of links that commonly share the test segment to be tested, the test segment being directly connected to a first network device and a second network device;

sending a plurality of packet bursts from a plurality of source nodes to a plurality of destination nodes via ~~a link of~~ the plurality of links so that the plurality of packet bursts flow through the test segment simultaneously, [[the]] each link including at least the test segment, each of the plurality of source nodes being under the centralized control of a central server remote to each of the plurality of source nodes, wherein the central server is utilized to command the plurality of source nodes to send the plurality of packet bursts at specific start times; and

receiving a packet burst of the plurality of [[the]] packet burst at a destination node of the plurality of destination nodes, the packet burst comprising a plurality of packets, wherein a first time stamp TS_{first} of the first packet of the packet burst, a last time stamp TS_{last} of the last packet of the packet burst and a byte count measurement measuring the bytes $Bytes_{total}$ in the packet burst are made at the destination node, the bandwidth capacity of the test segment in bit per second being calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{TS_{last} - TS_{first}}$.

13. (Previously Presented) The method of claim 12, wherein the length L of the packet burst is related to a Degree of Desynchronization (DoD) by an expression, $L = \frac{DoD}{ErrLim}$, where ErrLim represents a maximum desired error in the bandwidth capacity determination.

14. (Currently Amended) A method for determining bandwidth capacity of a test segment in a non-time synchronized network, the method comprising:

identifying a plurality of links that commonly share the test segment to be tested, the test segment being directly connected to a first network device and a second

network device;

sending ~~a packet stream~~ a plurality of packet streams from a plurality of source nodes to a plurality of destination nodes via ~~a link of~~ the plurality of links so that the plurality of packet streams flow through the test segment simultaneously, [[the]] each link including at least the test segment, each of the plurality of source nodes being under the centralized control of a central server remote to each of the plurality of source nodes, wherein the central server is utilized to command the plurality of source nodes to send the plurality of packet streams at specific start times, the plurality of packet streams each having a length L_{single} that ensures at least two measurements for byte count measurement can be made at [[the]] a destination node;

receiving the packet streams at the plurality of destination nodes, the packet streams comprising a plurality of packets;

taking at least two measurements MT_n, MT_{n-1} at each of the destination nodes while the packet streams [[is]] are being received, the two measurements MT_n, MT_{n-1} being separated by a measurement period T; and

making a byte count measurement measuring the bytes $Bytes_{total}$ in each of the packet streams between the measurements MT_n, MT_{n-1} at each of the destination nodes, the bandwidth capacity for each of the packet streams of the test segment in bit per second being calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{MTn - MT_{n-1}}$, wherein MT_n represents a measurement time when a lowest byte count is measured, MT_{n-1} represents a measurement time before the lowest byte count is measured, and $Bytes_{total}$ represents a byte count total during a measurement period with the lowest byte count, and the total bandwidth capacity equals a sum of all the smallest bandwidth

capacities of each of the packet streams.

15. (Original) The method of claim 14, wherein the length L_{single} of the packet stream is greater than or equal to (2 * T) + 2ε, where epsilon is used to compensate for small timing error.

16. (Currently Amended) The method of claim 14, further comprising triggering the destination SN to take [[the]] a first measurement MT_{first} when it receives the first few packets in the packet stream, wherein the length L_{single} of the packet stream is greater than or equal to T + 2ε, where epsilon is used to compensate for small timing error.

17. (Currently Amended) A network system for determining bandwidth capacity of a test segment in a network, comprising:

a plurality of links interconnecting nodes residing on the edge of the network, each of the links being identified as commonly sharing the test segment;

a plurality of source nodes that send a plurality of packet profiles for traveling through the plurality of links, each link including the test segment, the plurality of packet profiles~~, or a portion thereof,~~ being sent at specific start times so that the plurality of packet profiles flow through the test segment ~~essentially~~ simultaneously;

a central server remote to each of the plurality of source nodes to command the plurality of source nodes to send the plurality of packet profiles at the specific start times; and

a plurality of destination nodes that receive the plurality of packet profiles, wherein each of the packet profiles comprises a plurality of packets, and byte count measurements and time stamps are made at the plurality of destination nodes.

18. (Cancelled)

19. (Original) The network system of claim 17, wherein the network is a time synchronized network and each of the plurality of packet profiles is a packet burst.

20. (Previously Presented) The network system of claim 19, wherein the length L of each of the packet bursts is related to a Degree of Desynchronization (DoD) by an expression, $L = \frac{DoD}{ErrLim}$, where ErrLim represents a maximum desired error in the segment bandwidth capacity determination.

21. (Original) The network system of claim 20, wherein the time stamps made at each of the plurality of destination nodes are a first time stamp TS_{first} of the first packet of the packet burst received from each corresponding source node and a last time stamp TS_{last} of the last packet of the packet burst received from each corresponding source node, and the byte count measurements measure the bytes $Bytes_{total}$ in each of the packet bursts received at each corresponding destination node.

22. (Original) The network system of claim 21, wherein an individual flow rate in bit per second due to each packet burst is calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{TS_{last} - TS_{first}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

23. (Original) The network system of claim 17, wherein the network is a non-time synchronized network and each of the plurality of packet profiles is a packet stream, and a plurality of byte count measurements are made over a time measurement period T at each of the plurality of destination nodes.

24. (Previously Presented) The network system of claim 23, wherein the

length $L_{multiple}$ of the packet stream is related to a Degree of Desynchronization (DoD) by an expression, $L_{multiple} = (4 * T) + 2\varepsilon$, where the time measurement period T is one half of DoD and epsilon ε is used to compensate for small timing errors.

25. (Original) The network system of claim 24, wherein the time stamps made at each of the plurality of destination nodes are a plurality of time measurements MT_n, where n is an integer, each time measurements MT_n being separated by the time measurement period T and each measuring byte count over the period T since last time measurement MT_{n-1} in each of the packet streams received at each corresponding destination node.

26. (Original) The network system of claim 25, wherein an individual flow rate in bit per second due to each packet stream at the test segment is related to the smallest byte count measurement $Bytes_{total}$ of all byte count measurements taken for the packet stream, the individual flow rate being calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{MT_n - MT_{n-1}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

27. (Original) The network system of claim 17, wherein a link bandwidth capacity of a link is determined by measuring the bandwidth capacity of each of the segments that make up the link, the link having a maximum throughput of the slowest segment in the link.

28. (Original) The network system of claim 17, wherein the nodes are distributed at the edges of the network and exist in stand-alone boxes.

29. (Original) The network system of claim 17, wherein the nodes are added

as software modules to existing end hosts or network devices.

30. (Currently Amended) A computer readable medium for use in conjunction with a network system including a plurality of nodes for determining segment bandwidth capacity, the computer readable medium including computer readable instructions encoded thereon for:

identifying a plurality of links that commonly share the test segment to be tested, the test segment being directly connected to a first ~~network device~~ router and a second ~~network device~~ router;

sending a plurality of packet profiles from a plurality of source nodes to a plurality of destination nodes via the plurality of links, each link connecting a source node with a destination node, each link including the test segment, and each of the plurality of source nodes being under the centralized control of a central server remote to each of the plurality of source nodes;

manipulating start times for sending the plurality packet profiles~~, or a portion thereof,~~ from the plurality of source nodes~~, or a portion thereof,~~ so that the plurality of packet profiles flow through the test segment ~~essentially~~ simultaneously, wherein the central server is utilized to command the plurality of source nodes to send the plurality of packet profiles at specific start times; and

receiving the plurality of packet profiles at the plurality of destination nodes, wherein each of the packet profiles comprises a plurality of packets, and byte count measurements and time stamps are made at the plurality of destination nodes.

31. (Original) The computer readable medium of claim 30, wherein the network is a time synchronized network and each of the plurality of packet profiles is a

packet burst.

32. (Previously Presented) The computer readable medium of claim 31, wherein the length L of each of the packet bursts is related to a Degree of Desynchronization (DoD) by an expression, $L = \frac{DoD}{ErrLim}$, where ErrLim represents a maximum desired error in the segment bandwidth capacity determination.

33. (Original) The computer readable medium of claim 32, wherein the time stamps made at each of the plurality of destination nodes are a first time stamp TS_{first} of the first packet of the packet burst received from each corresponding source node and a last time stamp TS_{last} of the last packet of the packet burst received from each corresponding source node, and the byte count measurements measure the bytes $Bytes_{total}$ in each of the packet bursts received at each corresponding destination node.

34. (Original) The computer readable medium of claim 33, wherein an individual flow rate in bit per second due to each packet burst is calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{TS_{last} - TS_{first}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

35. (Original) The computer readable medium of claim 30, wherein the network is a non-time synchronized network and each of the plurality of packet profiles is a packet stream, and a plurality of byte count measurements are made over a time measurement period T at each of the plurality of destination nodes.

36. (Previously Presented) The computer readable medium of claim 35, wherein the length $L_{multiple}$ of the packet stream is related to a Degree of Desynchronization (DoD) by an expression, $L_{multiple} = (4 * T) + 2\varepsilon$, where the time

measurement period T is one half of DoD and epsilon ε is used to compensate for small timing errors.

37. (Original) The computer readable medium of claim 36, wherein the time stamps made at each of the plurality of destination nodes are a plurality of time measurements MT_n, where n is an integer, each time measurements MT_n being separated by the time measurement period T and each measuring byte count over the period T since last time measurement MT_{n-1} in each of the packet streams received at each corresponding destination node.

38. (Original) The computer readable medium of claim 37, wherein an individual flow rate in bit per second due to each packet stream at the test segment is related to the smallest byte count measurement $Bytes_{total}$ of all byte count measurements taken for the packet stream, the individual flow rate being calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{MT_n - MT_{n-1}}$, and a total flow rate through the test segment is the sum of all individual flow rates.

39. (Original) The computer readable medium of claim 30, wherein a link bandwidth capacity of a link is determined by measuring the bandwidth capacity of each of the segments that make up the link, the link having a maximum throughput of the slowest segment in the link.

40. (Currently Amended) A computer readable medium for use in conjunction with a time synchronized network system including a plurality of nodes for determining segment bandwidth capacity, the computer readable medium including computer readable instructions encoded thereon for:

identifying a plurality of links that commonly share the test segment to be

tested, the test segment being directly connected to a first network device and a second network device;

sending a <u>plurality of</u> packet burst<u>s</u> from a <u>plurality of</u> source node<u>s</u> to a <u>plurality of</u> destination node<u>s</u> via ~~a link of~~ the plurality of links <u>so that the plurality of packet bursts flow through the test segment simultaneously</u>, [[the]] <u>each</u> link including at least the test segment<u>, each of the plurality of source nodes being under the centralized control of a central server remote to each of the plurality of source nodes, wherein the central server is utilized to command the plurality of source nodes to send the plurality of packet bursts at specific start times</u>; and

receiving <u>a packet burst of the plurality of</u> [[the]] packet burst at <u>a destination node of the plurality of</u> destination node<u>s</u>, the packet burst comprising a plurality of packets, wherein a first time stamp TS_{first} of the first packet of the packet burst, a last time stamp TS_{last} of the last packet of the packet burst and a byte count measurement measuring the bytes $Bytes_{total}$ in the packet burst are made at the destination node, the bandwidth capacity of the test segment in bit per second being calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{TS_{last} - TS_{first}}$.

41. (Previously Presented) The computer readable medium of claim 40, wherein the length L of the packet burst is related to a Degree of Desynchronization (DoD) by an expression, $L = \frac{DoD}{ErrLim}$, where ErrLim represents a maximum desired error in the bandwidth capacity determination

42. (Currently Amended) A computer readable medium for use in conjunction with a non-time synchronized network system including a plurality of nodes for

determining segment bandwidth capacity, the computer readable medium including computer readable instructions encoded thereon for:

identifying a plurality of links that commonly share the test segment to be tested, the test segment being directly connected to a first network device and a second network device;

sending ~~a packet stream~~ a plurality of packet streams from a plurality of source nodes to a plurality of destination nodes via ~~a link of~~ the plurality of links so that the plurality of packet streams flow through the test segment simultaneously, [[the]] each link including at least the test segment, each of the plurality of source nodes being under the centralized control of a central server remote to each of the plurality of source nodes, wherein the central server is utilized to command the plurality of source nodes to send the plurality of packet streams at specific start times, the plurality of packet streams each having a length L_{single} that ensures at least two measurements for byte count measurement can be made at [[the]] a destination node;

receiving the packet streams at the plurality of destination nodes, the packet streams comprising a plurality of packets;

taking at least two measurements MT_n, MT_{n-1} at each of the destination nodes while the packet streams [[is]] are being received, the two measurements MT_n, MT_{n-1} being separated by a measurement period T; and

making a byte count measurement measuring the bytes $Bytes_{total}$ in each of the packet streams between the measurements MT_n, MT_{n-1} at each of the destination nodes, the bandwidth capacity for each of the packet streams of the test segment in bit per second being calculated using an expression, $Rate(bps) = \frac{Bytes_{total} * 8}{MTn - MT_{n-1}}$, wherein

MT_n represents a measurement time when a lowest byte count is measured, MT_{n-1} represents a measurement time before the lowest byte count is measured, and $Bytes_{total}$ represents a byte count total during a measurement period with the lowest byte count, and the total bandwidth capacity equals a sum of all the smallest bandwidth capacities of each of the packet streams.

43. (Original) The computer readable medium of claim 42, wherein the length L_{single} of the packet stream is greater than or equal to $(2 * T) + 2\varepsilon$, where epsilon is used to compensate for small timing error.

44. (Currently Amended) The computer readable medium of claim 42, further comprising computer readable instruction encoded thereon for triggering the destination SN to take [[the]] a first measurement MT_{first} when it receives the first few packets in the packet stream, wherein the length L_{single} of the packet stream is greater than or equal to $T + 2\varepsilon$, where epsilon is used to compensate for small timing error.

45. (Original) The method of claim 1, wherein at least two of the plurality of packet profiles from at least two of the plurality of source nodes may be sent to the same destination node.

46. (Original) The network system of claim 17, wherein at least two of the plurality of packet from at least two of the plurality of source nodes profiles may be received by the same destination node.

47. (Original) The computer readable medium of claim 30, wherein at least two of the plurality of packet profiles from at least two of the plurality of source nodes may be sent to the same destination node.